

Int. GARP meeting
made it

October 23, 1969

Summary of Alternatives for GARP

Introduction

Nine alternatives for GARP are defined (costs and timing) in the attachment to this summary. Because of the interrelationship among some of the alternatives, the actual numbering system used is 1, 2A, 2B, 2C, 3A, 3B, 3C, 4, 5 and tabs correspond to this system.

Alternative 1 is devoted to accomplishing all of the seven field experiments as described in the NAS "Plan for U. S. Participation in the Global Atmospheric Research Program" plus the Numerical Modeling and Observing System Simulation Experiments. These latter two numerical experiments are left intact in all later alternatives.

Alternatives 2A, 2B and 2C delete three of the field experiments and vary the geographical location and scale of other experiments.

Alternatives 3A, 3B and 3C delete two additional experiments for a total deletion of five of the original seven field experiments and consider the same variations in location and scale of other experiments as in Alternatives 2A, 2B and 2C.

Alternative 4 deletes one additional field experiment leaving only a modified Systems Test.

Alternative 5 deletes all field experiments leaving only the Numerical Modeling and the Observing System Simulation efforts.

Brief Description of Alternatives

Alternative 1 (Tab 1) describes the field experiments to be conducted to satisfy the Blue Book recommendations, except for some modifications in timing of the experiments. The Clear Air Turbulence experiment is not described in the same detail as the other experiments because it is assumed that the objectives will be met by the plans contained in the soon-to-be-published Federal Plan for Clear Air Turbulence.

The experiments contained in this alternative are:

<u>Experiment</u>	<u>Time</u>	<u>Place</u>
Clear Air Turbulence	Winters, 1970-1974	Central & Western U. S.
Trade Wind Inversion	June-July, 1971	Eastern Tropical Pacific
Strong Air Mass Modification	January-February, 1972	Off U. S. East Coast
Land Convection and Boundary Layer	April-June, 1974	Oklahoma-Kansas
Tropical Cloud Cluster	July-October, 1976	Marshall Islands, Pacific
Global Observing System Test	July-October, 1976	North Pacific
Popcorn Cumulonimbus	January-February, 1978	Amazon Basin, Brazil
Numerical Modeling Observing System Simulations	Now and continuing Now and continuing	U. S. Laboratories U. S. Laboratories

Alternative 2A (Tab 2A) eliminates the Trade Wind Inversion, Strong Air Mass Modification and Popcorn Cumulonimbus experiments. These eliminations have no significant effect on the conduct of the remaining experiments but do reduce the total costs.

Alternative 2B (Tab 2B) differs from 2A in that the Tropical Cloud Cluster (TCC) experiment would be conducted in the tropical Eastern Pacific or Atlantic Oceans and the Global Observing System Test would be conducted from North America. The TCC experiment would be on a somewhat reduced scale from that planned in Alternative 1 and would be conducted almost wholly with ships, buoys and aircraft, i.e., little, if any, use of islands for observation sites. Also, the TCC experiment would take advantage of the availability of a geosynchronous satellite planned to be over the area which would eliminate the need for and cost of procurement of an additional satellite.

In Alternative 2C (Tab 2C) the Tropical Cloud Cluster (TCC) experiment and the Global Observing System Test (as in Alternatives 1 and 2A) have been planned on a reduced scale comparable to that planned in Alternative 2B. The TCC experiment will take advantage of some islands in the Marshall Islands and will use ships and buoys for the remaining observation sites. This alternative would require the procurement of a geosynchronous satellite as in Alternatives 1 and 2A.

Alternative 3A (Tab 3A) differs from Alternative 2A in that the Clear Air Turbulence and Land Convection and Boundary Layer experiments have been eliminated. Since some of the equipment from the Land Convection and Boundary Layer experiment would be used in the Tropical Cloud Cluster experiment, those costs are not eliminated.

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ALTERNATIVE 2 B

PRELIMINARY PLANNING ~~ESTIMATES~~ *ASSUMPTIONS*

FOR

PROPOSED GARP EXPERIMENTS

Clear Air Turbulence (*not shown;*
same as before.)

Land Convection and Boundary Layer

Tropical Cloud Clusters
(in E. Pacific or Atlantic Ocean)

Global Observing System (N. America) Test


TROPICAL CLOUD CLUSTER EXPERIMENT

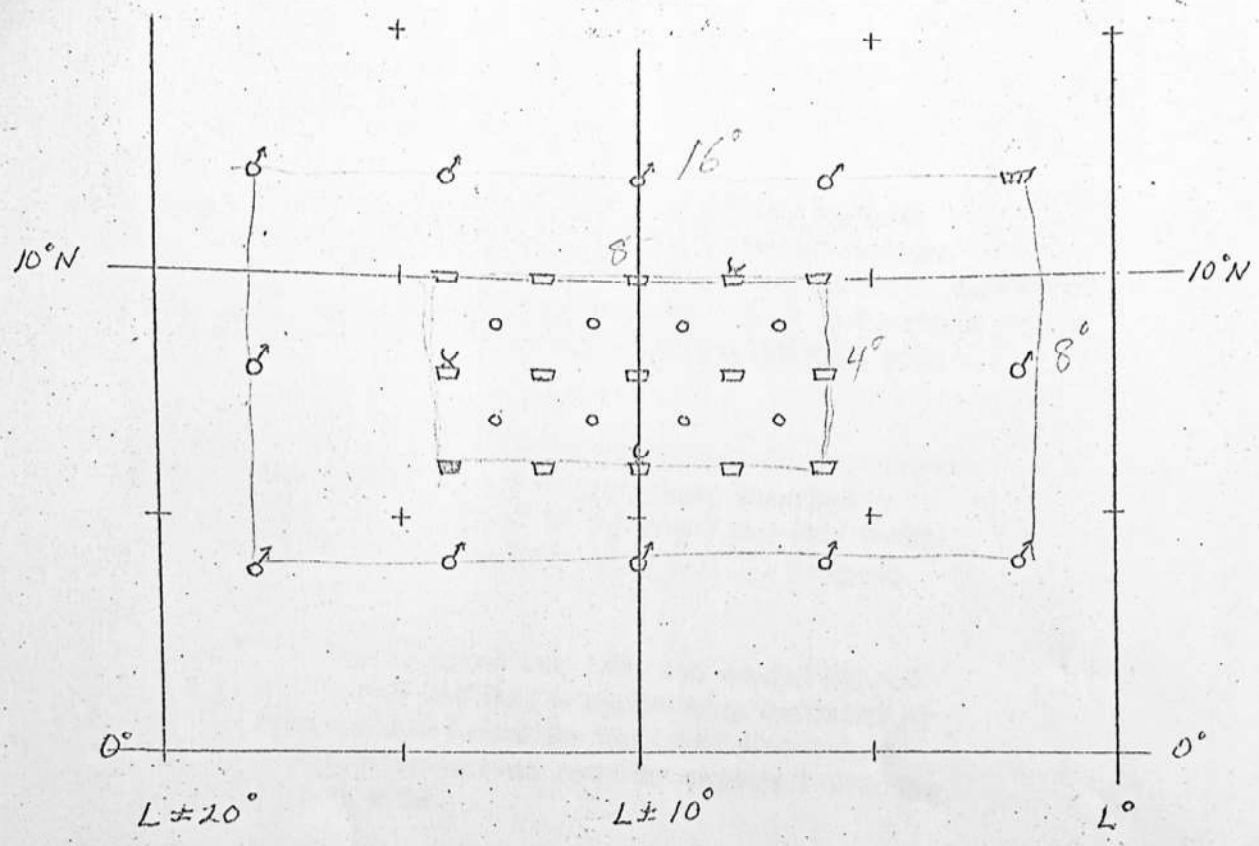
A. Assumptions:

1. The assumptions contained in Appendix A of Alternative 1 will apply.

2. The experiment will be conducted in August-October of 1976 over the eastern Tropical North Pacific Ocean or the tropical North Atlantic ocean over an area of the size shown in the attached figure; there will be "inner" and "outer" areas for conducting the experiment in conformance with the scale and parameter requirements stipulated on pages 55-57 of the USC-GARP plan; operations will be conducted almost wholly from ships, buoys, and aircraft for lack of islands in the area, and the scope of experiment will be somewhat reduced by limitations of the requisite resources.

3. Over the three-month period, there will be three 8 to 10 day periods when all experiment operations will shut down for maintenance, resupply, etc. In addition, an occasional one day shutdown will be needed for equipment maintenance and calibration. During the remainder of the time, there will be more-or-less continual operation depending upon occurrence of the cloud cluster events, i.e., the level of operations will increase or decrease and will be extended or cut short, as required, to take advantage of the meteorological events. Under these conditions, we assume, for cost estimating purposes, full observation operations on 30 days, reduced operations for 30 days and 30 days of no observation operations.

Control Center &
Aircraft Base
(Land Site) 



- Ships: Surface, Upper air, boundary layer, & oceanographic Obs
- ▤ Plus Communications & Alternate Control Center.
- ▨ Plus Aircraft Communications & homing point.
- K Weather Surveillance Radar
- Buoys: Surface weather & Air-Sea Interface Obs.
(Also established location for dropsondes)
- ♂ Plus Beacon transponder for Aircraft.

ASSUMED CONFIGURATION FOR TROPICAL CLOUD CLUSTER EXPERIMENT IN EASTERN PACIFIC OR ATLANTIC OCEAN; *IF SLIGHTLY REVISED FOR WEST CENTRAL PACIFIC*

(Direction of grid may be re-oriented, or grid intervals may be ^{somewhat} expanded or contracted without change in cost.)